December 11, 1962

Mr. Charles G. Johnston
U. S. Geological Survey
Military Geology Branch
Honolulu, Hawaii

Dear Charlie:

Thank you for your letter of December 7 regarding the proposed IR survey of Kilauea or Mauna Loa. We will be happy to help on this program in any way including guidance as to the currently most favorable regions. We should, of course, be better informed as to the capabilities of the instrument, the affect of reflected solar energy from different types of vegetative cover, etc.

By copy of this letter to R. M. Moxham, I suggest that now is a very favorable time for a limited, reconnaissance survey. Four days ago approximately 15 million cubic yards of magma moved at least 7 miles from the main magma reservoir into the upper part of the east rift zone of Kilauea. The boundaries of this mass of lava are reasonably well known, and the possibility of monitoring its cooling history is of importance to those of us studying the volcano.

We will be expecting to see you at the end of the month.
Merry Christmas.

Best regards,

/s/ Jim
James G. Moore
Scientist in Charge

cc: Moxham

HVO:IR

MEMORANDUM December 13, 1962

To: Charles G. Johnson
Military Geology Branch, Hawaii

From: R. M. Hanham

Subject: Infrared survey, Hawaii

I received a call today from Major Gentry, Office of Chief of Engineers, regarding USARPAC's response of September 17, 1962, to our request for IR surveys. It was his feeling that USARPAC's view was unnecessarily negative and he felt that our project should be implemented. Gentry offered to work out an arrangement at a fairly high level to see that this is done and to send someone to Hawaii to expedite matters.

It seemed best to me to try to get the cooperation of USARPAC through your diplomatic efforts, as outlined in my memo to you of December 11. Gentry mentioned that a Col. Cheeley, Engineer for Mapping, USARPAC, may carry some weight in this matter, but I urge that you avoid implying to the operations people that any pressure is being put on them. We need their full cooperation and I hope we can convince them of the merits of our plan. If, however, you meet with a completely negative response, I'll take the case to a higher court. I told Gentry we would defer using his good offices until we hear from you.

We greatly appreciate your efforts on our behalf Charlie, and if you need any further information, or if we can assist in any way, don't hesitate to call.

cc: W. E. Hall
D. E. Dow
W. A. Fischer
R. L. Smith
J. G. Moore, HVO

MEMORANDUM December 11, 1962

To: Charles G. Johnson
Military Geology Branch, Hawaii

From: H. M. Moxham
Chief, Branch of Theoretical Geophysics

Subject: Infrared Survey, Hawaii

Thanks very much for your informative memorandum of December 7. We would be delighted if you could provide the necessary liaison with USARPAC which no doubt will be required. We have not yet received a copy of the Engineer's letter of September 1/ to Lt. Col. McBride but it would be best to proceed without further delay.

First, let me answer some of the questions you raise:

Bill Fischer's Remote Sensing project will have responsibility for the technical guidance of the work, for any ground control that may at some future time become desirable, and for interpretation of the results. We plan to work closely with the people at HVO, as their knowledge of the geologic setting would be essential to any meaningful interpretation. However, we know HVO is heavily committed to other work and we hope not to burden them to any extent other than brain-picking.

As the imagery is classified Confidential, we would ask to retain a copy (either positive or negative) here where we have appropriate facilities.

Our objective is to determine in general what relation exists between the (near)surface IR emission and subsurface heat sources. As a specific example, how far (time-distance) preceding a rift outbreak does the near surface IR emission rise to a detectable level above the "noise" or background. One could make some calculations but I have the feeling there are so many unknowns that an empirical approach would be more fruitful.

As a starter, I suggest we try to arrange that some imagery, preferably including the Kilauea rift zones, be obtained in connection with the training flights. If USARPAC is willing to do this, either Bill Fischer or I would meet with you to discuss the geologic capabilities of the instruments and to work out the matter of technical guidance.

I hope we can get going on this promptly as it looks as if things may be cooking on Kilauea.

cc: D. H. Dow
W. A. Fischer
R. L. Smith
J. G. Moore, HVO

H. M. Moxham
Chief, Branch of Theoretical Geophysics

Bldg 96, Ft. Armstrong
Honolulu 13, Hawaii

MEMORANDUM

December 7, 1962

To: R. M. Mayhew
Chief, Branch of Theoretical Geophysics

From: Charles G. Johnson
Military Geology Branch, Hawaii

Subject: Infrared survey, Hawaii

Reference is made to your memorandum dated November 30, 1962, subject as above.

The Engineer, USARPAC, replied to Lt. Col. McBride's letter on September 17, 1962. Action on the proposed IR survey was disapproved because the survey would have tied up the aircraft for too long a period. The Engineer suggested that some "hot" areas on the Mainland be tested prior to committing so much effort to a full scale program such as proposed on Hawaii. I believe if you called McBride at CGS, he can provide you with a copy of the Engineer USARPAC letter.

I was present at discussions of the IR survey after the Engineer had sent his reply to McBride. Aside from the great size of the survey, questions were raised as to:

Who would interpret the photos?
Were the negatives or prints to be sent to the Hawaiian Volcano Observatory?
Who would provide technical (geologic in this case) guidance during the program?
Where and how would Survey, Army, and manufacturer's technicians get together to discuss results and possible improvements in procedures and equipment?

The attitude of the discussants was one of interest in the IR survey and all would have liked to have seen some test flights made. However, some of the officers and engineers felt they knew enough about the capabilities of the equipment to suggest a testing program.

So much for the past, the present situation is as follows. One aircraft capable of IR photography is here assigned to the 69th Aviation Company on Oahu and will remain here. IR equipment for the aircraft is scheduled to arrive in December. Manufacturer's representatives are due to arrive

in December or January to install the equipment and to train local Aviation and Signal Corps personnel in its use. It is expected that the aircraft will be assigned numerous training missions during the next year. Some of the missions, no doubt, will be carried out on Hawaii in the Pohakuloa Training Area.

I am certain that advantage can be taken of the training mission on Hawaii to fly parts of Kilauea and Mauna Loa. I am willing to provide the necessary liaison with the 65th Aviation Company to accomplish your project. I believe that after a few successful flights have been made, a more systematic program of IR surveillance can be arranged. In order for us to discuss training missions having volcanologic rather than military objectives, it will be necessary for us to know more about the objectives of the original program and the present status of IR photography. In addition, I believe it would be helpful if the Hawaiian Volcano Observatory were furnished the same information so flight crews can obtain guidance when on Hawaii.

Charles G. Johnson
Geologist

cc: W. A. Fisher
D. H. Dow
D. F. Davidson
V. R. Wilmarth
J. Moore (HVO)

BEST COPY

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Approved For Release 2000/08/22 : CIA-RDP78B04747A000100030009-9

Lt. Col. Francis G. McKeige
Chief, Mapping & Charting Division
Topography & Military Engineering
Department of the Army
Washington 25, D. C.

Dear Colonel McKeige:

We are pleased to learn by your letter of August 27, 1962, that the Corps of Engineers has requested the U. S. Army Pacific to obtain our proposed infrared studies in Hawaii. We will assume that your office will inform us of the action taken by U. S. Army Pacific.

Sincerely yours,

Director

RMBonham/ea
G-9/5/62

cc: General File
Director's Chron file
Geologic Division
Experimental Geology
Theoretical Geophysics
W. A. Fischer
Robt. Smith

Incoming #135427

September 6, 1962

R. L. Smith
Chief, Geochemistry & Petrology Branch

R. M. Mowinckel
Chief, Branch of Theoretical Geophysics

IR surveys, Hawaii

After our conversation on infrared surveys in Hawaii, I contacted a friend at ENDL to determine whether the Corps of Engineers might be in a position to furnish an aircraft equipped with an IR scanner. As a result of our conversation the attached proposal was made, which describes in some detail the work plan which we have in mind.

As you will see, our proposal has been accepted by the Corps of Engineers and they have requested that such an aircraft be made available to us. We are now awaiting word from U. S. Army Pacific as to when we can go ahead.

I would appreciate it if you and Jim Moore would have a look at our work plan and offer any comments that you care to make. We will keep you informed on the progress of our negotiations and will confer with you at such time as it appears that we might actually get under way.

cc: W. A. Fischer

ENGTE-M

27 August 1962

Director
Geological Survey
Department of the Interior
Washington 25, D. C.

Dear Mr. Nolan:

The Office of the Chief of Engineers has initiated a request that the U. S. Army Pacific provide the flights requested in your letter of 19 July 1962 to the Director, CINCRADA.

The Corps of Engineers is interested in the use of infrared sensors to provide information concerning change and rate of change in the thermal field of volcanic areas as a potential technique for the long range prediction of volcanic activity. If this proves feasible, it should be possible for the Geological Survey to develop a volcanic eruption prediction and warning system for use in volcanic areas capable of providing longer range and more accurate prediction than is possible now. It will be appreciated if your personnel would consider this application, investigate its feasibility in conjunction with their own work and provide information on this subject to CINCRADA.

Sincerely yours,

FRANCIS G. McBRIDE, Lt Col, CE
Chief, Mapping & Geodesy Division
Topography & Military Engineering

7/19/62

Director
U. S. Corps of Engineers
Geodesy Intelligence and Mapping
Research Agency
Intelligence Division
Fort Belvoir, Virginia

Dear Sir:

The U.S. Geological Survey has maintained a Volcano Observatory on the Island of Hawaii for the past 50 years. The Observatory serves as a base of operations from which we are conducting basic research on volcanic processes, which includes a study of the thermal regime.

The relatively recent development of aerial infrared scanners suggests to us a means of obtaining a great deal of information on surficial thermal patterns that would be almost impossible to obtain by more conventional techniques. We are particularly interested, of course, in determining to what extent such patterns may relate to present or recent volcanic activity on the island. It would be very desirable to make a sequence of aerial observations to find whether there are any detectable changes in the thermal patterns that can be related to subsurface volcanic processes. In addition to the potential value of the thermal pattern analysis, the surveys would provide an opportunity to temperature-calibrate the aerial IR scanner with respect to natural sources that we are presently monitoring on Kilauea.

In view of the Corps of Engineers' responsibilities in volcanically active areas, and your interest in the operational characteristics of IR scanners, we would like to suggest a cooperative investigation of the southern part of the island of Hawaii. The Geological Survey would take the prime responsibility for interpreting the thermal imagery and for providing necessary ground control. The Corps of Engineers, we would hope, could supply the infrared-equipped light reconnaissance aircraft to obtain the thermal imagery.

We would plan to fly the southern part of the island of Hawaii as indicated on the accompanying map, at about 3,000 feet above terrain. The parallel red lines would give complete coverage of the Kilauea calderas, the east and southwest Kilauea rift zones, and reconnaissance coverage of the Mauna Loa southwest rift. The green area would be flown at a somewhat lower altitude and only along a sufficient number of lines, parallel to the rifts, to give us detailed coverage of the Kilauea rift zones.

The Kilauea eruption cycle is approximately as follows: Swelling is observed (by tiltmeters) and is accompanied by increased seismic activity prior to an eruption at the summit calderas. Two to four weeks after the summit eruption, lava breaks out at some point along the rift zones. This cycle suggests the following flight sequence: (a) complete systematic coverage (red lines) during a pre-eruption, with repeated coverage at selected intervals, until a summit eruption; (b) flights along the rift zones only (green) at increased frequency until a lava outbreak occurs; (c) detailed surveys in the outbreak area.

We hope that you will find this proposal to be of interest and we will be pleased to discuss it in more detail if you find it acceptable.

Sincerely yours,

Director

Attachment

RMMoxham/sa
G-7/18/62

cc: General File
Director's Chron file
Geologic Division
Theoretical Geophysics Br. file
" " Reading "
W. A. Fischer

MEMORANDUM June 25, 1962

To: James G. Moore
Field Geochemistry & Petrology Branch
Hawaii Volcano Observatory

From: R. M. Moxham
Chief, Branch of Theoretical Geophysics

Subject: Thermal survey

We are starting to make plans for a thermal survey in Hawaii probably some time in the early fall if all goes well and providing it can be done at reasonable cost. The survey will be made with an aerial scanner that will give us an image of the earth's emission in the 8 to 14 micron part of the spectrum. We will obtain along each flight line imagery from a swath about 2,000 feet wide.

After discussions with Bob Smith, we plan to fly the Kilauea and Mauna Loa rift zones and, time and money permitting, perhaps rift zones on some of the other shields on Hawaii and possibly Maui.

I just wanted to let you know what we have in mind. If you have any areas of particular interest, please let us know.

cc: R. L. Smith
W. A. Fischer